CLAIMS

1. A nitride semiconductor product comprising an n-type layer, a light-emitting layer, and a p-type layer which are formed of a nitride semiconductor and sequentially stacked on a substrate in the above order,

said light-emitting layer having a quantum well structure in which a well layer is sandwiched by barrier layers having band gaps wider than the band gap of the well layer,

wherein each barrier layer comprises a barrier sublayer C which has been grown at a temperature higher than a growth temperature of said well layer, and a barrier sublayer E which has been grown at a temperature lower than a growth temperature of said barrier sublayer C, and said barrier sublayer C is disposed closer to said substrate with respect to said barrier sublayer E.

2. A nitride semiconductor product according to claim 1, wherein the nitride semiconductor is represented by formula $In_xAl_yGa_{1-x-y}N$ ($0 \leq x < 1$, $0 \leq y < 1$, $0 \leq x + y < 1$).

3. A nitride semiconductor product according to claim 1 or 2, wherein one or more of said barrier layers further comprise a barrier sublayer A which has been grown at a temperature lower than a growth temperature of said barrier sublayer C, and said barrier sublayers A, C, and E are stacked, in this order.

4. A nitride semiconductor product according to claim 3, wherein one or more of said barrier layers comprise a barrier sublayer B which has been grown at a temperature lower than a growth temperature of said barrier sublayer C, said barrier sublayer B intervening between said barrier sublayers A and C.

5. A nitride semiconductor product according to any one of claims 1 to 4, wherein one or more of said barrier layers comprise a barrier sublayer D which has been grown at a temperature lower than a growth

temperature of said barrier sublayer C, said barrier sublayer D intervening between said barrier sublayers C and E.

6. A nitride semiconductor product according to any one of claims 1 to 5, wherein the difference between the growth temperature of said barrier sublayer C and the growth temperature of said well layer is 50°C or more.

7. A nitride semiconductor product according to any one of claims 1 to 6, wherein the difference between the growth temperature of said barrier sublayer C and the growth temperature of said barrier sublayer E is 50°C or more.

8. A nitride semiconductor product according to any one of claims 3 to 7, wherein the difference between the growth temperature of said barrier sublayer C and the growth temperature of said barrier sublayer A is 50°C or more.

9. A nitride semiconductor product according to any one of claims 1 to 8, wherein the growth temperature of said well layer falls within a range of 600°C to 1,000°C.

10. A nitride semiconductor product according to any one of claims 2 to 9, wherein said well layer comprises GaInN.

11. A nitride semiconductor product according to any one of claims 2 to 10, wherein said barrier layer comprises GaInN or GaN.

12. A nitride semiconductor product according to any one of claims 1 to 11, wherein at least one layer selected from said well layer and said barrier layer contains an n-type dopant.

13. A nitride semiconductor product according to claim 12, wherein said n-type dopant is an Si.

14. A nitride semiconductor product according to claim 12, wherein said n-type dopant is a Ge.

15. A nitride semiconductor product according to

any one of claims 12 to 14, wherein a concentration of said n-type dopant in at least one layer selected from said well layer and said barrier layer varies periodically.

16. A nitride semiconductor product according to claim 15, wherein a layer containing said n-type dopant and an undoped layer are stacked alternately.

17. A nitride semiconductor product according to claims 15 or 16, wherein a higher layer at the concentration of said n-type dopant is not thicker than a lower layer.

18. A nitride semiconductor product according to any one of claims 12 to 17, wherein the layer containing said n-type dopant has an n-type dopant concentration of 1×10^{16} to 5×10^{19} cm^{-3}.

19. A nitride semiconductor light-emitting device comprising a nitride semiconductor product according to any one of claims 1 to 18, a negative electrode provided on an n-type layer of said nitride semiconductor product and a positive electrode provided on a p-type layer of said nitride semiconductor product.

20. A light-emitting diode comprising a nitride semiconductor product according to any one of claims 1 to 18.

21. A laser device comprising a nitride semiconductor product according to any one of claims 1 to 18.

22. A lamp comprising a nitride semiconductor product according to any one of claims 1 to 18.

23. A method for producing a nitride semiconductor product, said method comprising sequentially stacking on a substrate a nitride semiconductor n-type layer, a nitride semiconductor light-emitting layer of a quantum well structure, and a nitride semiconductor p-type layer, thereby producing a nitride semiconductor product having a quantum well structure, wherein said method comprises growing a well layer;

subsequently, elevating a growth temperature;

growing a barrier layer of the quantum well structure at the elevated temperature, which is higher than a growth temperature of the well layer;

subsequently, lowering the growth temperature; and

further growing the barrier layer at the lowered temperature.

24. A method for producing a nitride semiconductor product according to claim 23, which further comprises growing said barrier layer before elevating the growth temperature.

25. A method for producing a nitride semiconductor product according to claims 23 or 24, wherein growing of said barrier layer is performed in at least one step of elevating the growth temperature and lowering the growth temperature.

26. A method for producing a nitride semiconductor product according to any one of claims 23 to 25, wherein said barrier layer contains an n-type dopant.

27. A method for producing a nitride semiconductor light-emitting device, said method comprising

a step of removing a portion of a light-emitting layer and a p-type layer of a nitride semiconductor product according to any one of claims 1 to 18, thereby exposing an n-type layer,

a step of providing a negative electrode on the exposed n-type layer, and

a step of providing a positive electrode on the p-type layer.

28. A method for producing a light-emitting diode, comprising a step of providing a lead to a nitride semiconductor light-emitting device according to claim 19.

29. A method for producing a laser device, comprising a step of providing a lead to a nitride

semiconductor light-emitting device according to claim 19.

30. A method for producing a lamp, comprising a step of providing a cover containing a phosphor to a nitride semiconductor light-emitting device according to claim 19.